Chapter	Responder	Page	Line(s)	Comment	Reviewer	Notes
8. Sea Ice						
General	Fitzpatrick			The chapter is well written and provides a comprehensive overview of geological, historical and recent ice conditions in the Arctic.	e	**Noted**
General	Fitzpatrick			Very thorough and interesting compilation of paleoclimate information, especially the section 8.3 is very fluently and easy to read and understand. Be consistent by using either sea ice or sea-ice	l	**Noted**
Abstract	Polyak	2	31-33	Sea ice less under warmer climate events associated with changes in the Earths orbital parameters on the time scale of tens of thousands of year; a reference would be nice	l	**Taken into account (discussed in Section 8.4.2 and in Chapter 4)**
	Polyak	6	117-120	It would be useful to say more about why altered winter sea ice affects circulation like the NAO, especially since this is likely to include feedbacks between the two systems (it's highly unlikely they exist in isolation).	b	**Taken into account. Explained on lines 119-120.**
8.3.6	Polyak	20	439	higher (not warmer) temperatures	e	**Accepted**
8.4.4	Polyak	24		I noted the omission of reference to Vinje's work in the Barents Sea: Vinje, T. 1999. Barents Sea ice edge variation over the past 400 years. Extended Abtracts, Workshop on Sea-ice Charts of the Arctic, Seattle, WA, World Meteorological Organization, WMO/TD No. 949, 4-6. Vinje, T.. 2001 Anomalies and Trends of Sea-Ice Extent and Atmospheric Circulation in the Nordic Seas during the Period 1864–1998. Journal of Climate 14: 255–67. Also, the recent work on the Russian sea ice record for 1933-2006 by Mahoney et al. Mahoney, A.R., e, R. G., Smolyanitsky, V. M. and Fetterer, F. 2008. 20th century Russian sea ice extents from observations. 38th International Arctic Workshop, Program and Abstracts, Institute of Arctic and Alpine Research, University of Colorado, Boulder, CO. pp. 84-86.	e	**Accepted**

Chapter	Responder	Page	Line(s)	Comment	Reviewer	Notes
8.4.3	Polyak	36	809	explain ‘seesaw ‘ effect	e	**Accepted**
8.4.3	Polyak	36	815	give approx dates for Little Ice Age and Medieval Warm Epoch	e	**Taken into account (see explanations on lines 749 and 827)**
8.4.3	Polyak	37	825	Dark Ages applies only to western Europe; give time range	e	**Corrected**
	Polyak	7	151-156	September extent is certainly the most dramatic but it would also be useful to have a visual of the other months (though not necessarily all) to emphasize that change has been occurring year-round.	b	**Taken into account (contributors contacted for a respective figure)**
8.1	Polyak	3	49	is the thinning also accelerating ?	l	**Corrected (wording changed)**
8.1	Polyak	3	50	seasonally ice free in 2030 … change to 2040 according to text	l	**Accepted**
8.2.1	Polyak	4	70	(provide) Reference to the numbers of sea ice extent …	l	**Accepted**
8.2.1	Polyak	4	81	3m peak is this a number covering all Arctic sea ice ?!? Here again it would be nice with a reference	l	**Accepted**
8.2.1	Polyak	4	84-86	Here it would be nice to include WMO definition first-year ice < 2m in thickness, Multi-year ice > 2m in thickness, for people who do not have a clue about sea ice	l	**Accepted**
8.2.2	Polyak	7	134-147	What is the conclusion … it is a little vague. What if areas of newly formed sea ice which are believed to contribute to the deep water formation due to brine rejection disappears, e.g. the Oden area East of Greenland which are formed now and then and are believed to have a big influence on the NAO?	l	**Accepted**
8.3.1	Polyak	12	257	include the abbreviation ACEX (ACEX: Beckman et al., 2006) The Holocene section there is a lot of information …	l	**Accepted**
8.4.1	Polyak	24	541	Cenozoic – a definition of which time it covers	l	**Taken into account (see Chapter 4)**

Chapter	Responder	Page	Line(s)	Comment	Reviewer	Notes
8.4.1	Polyak	28	632	A more complete or a more detailed …. It will probably never be complete	l	**Accepted**
8.4.2	Polyak	29	644	It would be nice with a reference	l	**Accepted (reference to Chapter 4 inserted)**
8.4.2	Polyak	31	695	Historical limit – is it the same sea ice limits as shown in figure 8.1	l	**Accepted**
8.4.2	Polyak		696	Is it the Bering Strait	l	**Accepted**
8.4.3	Polyak	32	714	which records ?	l	**Accepted**
8.4.3	Polyak	33	752	3 C above mid-twentieth conditions … which are characterized as ?!?	l	**Accepted**
8.4.3	Polyak	34	757	briefly, met coinciding with the Atlantic bowhead penetrating into the central channels.	l	**Accepted**
8.4.3	Polyak	34	762-771	But how does this correlate to migration of the bowhead between the Atlantic and Pacific ?!?	l	**Corrected**
8.4.3	Polyak	34	769	wouldn't changes in forest composition and extent need a longer timespan than evident by the rapid decline 7 ka BP	l	**No change necessary** (discussed in Chapter 5)
8.4.3	Polyak	34	770	Peaked during the early Holocene … isn't it late Holocene according upper graph of figure 8.11	l	**Accepted, corrected** to mid Holocene
8.4.3	Polyak	34	777	Fig 8.12 does not cover 8.5 only 6.5 ka	l	**Accepted**
8.4.3	Polyak	35	786	what is progressively shorter from south to north ?	l	**Accepted. Text corrected**
8.4.4	Polyak	38	871-876	Even the thorough report I still find it unproven if similar events have occurred in the past, especially the speed of the process. This might be "hidden" in poorer resolution of drilling sites in the past ?	l	**Noted**
8.5	Polyak	39		Here again … it would be nice to point out that more data is needed from the past, drilling etc. in different regions to get a clearer picture of the past sea ice changes. The data available now on which the sea ice history rely on are very sparse.	l	**Taken into account (see last two sentences of the Synopsis)**
Figure 8.1	Polyak			Maksimum *[sic]*and minimum extent from which period ?!?	l	**Not clear which sentence is commented upon**

Chapter	Responder	Page	Line(s)	Comment	Reviewer	Notes
Figure 8.7	Polyak			Figure 8.7: I find the reference to Vostok temperature to be more distracting and confusing than of any use to understanding the rest of this figure. For one thing, it implies that Vostok provides a multi-million year record, which obviously it does not.	b	**Figure deleted**
Figure 8.8	Polyak			Figure 8.8: As in the previous figure, I find it awkward to be extrapolating the Vostok calibration to such a great temporal extent. This figure also implies that our understanding of temperature over the last 5+ Ma is based on a relatively recent calibration with the Vostok ice core, and that's clearly not true	b	**Figure deleted**
Fig 8.10	Polyak Fitzpatrick			It would be nice to have the timescale reversed to fit the timelines of the previous graphs going from old times (left) to today (right)	l	**Can be done, but is this really important?** **Leonid, The figures, as currently shown, accurately reflect the original publication. J.**
Fig. 8.11	Polyak Fitzpatrick			Here again it would be nice to have the timescale reversed to fit the timelines of the previous graphs going from old times (left) to today (right) – but at least it is important to have it the same as fig 8.10	l	**Can be done, but is this really important?** **See previous comment J.**
8.2.1	Polyak	4	68-78	lines 68-78 The numbers here need references.	j	**Taken into account (discussed in Section 8.4.2 and in Chapter 4)**
8.2.1	Polyak	5	94	line 94 A range should be given on the amount of ice export. I suspect this number is relative to the end of summer area, while the area relative to the winter maximum is more like 10%. A reference should be given as well.	j	**Taken into account. Explained on lines 119-120.**